Kentucky
CABINET FOR HEALTH SERVICES
DEPARTMENT FOR PUBLIC HEALTH
DIVISION OF EPIDEMIOLOGY
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Recommended Childhood Immunization

The Recommended Childhood Immunization Schedule, United States, January-December 1997, introduces two significant changes:

- DTaP vaccine is recommended to be used as the vaccine of choice for all infants and children where indicated under 7 years of age, even if it means giving a Hib vaccine at a separate site.
- For infants, children and adolescents, (<18 years of age) it is now recommended that the sequential schedule of a combination of IVP and OPV be implemented. The primary series is administered as two doses of IPV at ages 2 months and 4 months, followed by two doses of OPV, one at 12-18 months, and one at 4-6 years.

It should also be noted that Kentucky now has in effect an updated immunization regulation which supports these changes.

The main reason for the new "first choice" schedule recommendations are:

- DTaP is now available and licensed for all doses under the age of 7 and has been shown to result in fewer serious side effects as well as less frequent or severe minor side effects.
- The sequential IPV/OPV schedule will reduce vaccine-caused paralytic polio cases while maintaining adequate levels of immunity.

At the same time, however, we believe it is important that parents be able to make informed choices of alternate schedules. The alternative vaccines and range of scheduling shown in the Schedule (see insert) ought to be available if desired by parents. This includes all OPV or all IPV schedules. It also includes using the DTP-Hib combination, as long as the parent has been informed of the higher likelihood of side effects. Other ways to avoid having to give four injections at the 2-month-old visit are to give Hepatitis B #2 at age 1 month (but at least a month after the hospital dose), or to use the recently licensed Hepatitis B-Haemophilus influenzae type b (Hib) combination, which is available commercially, but not yet through the Vaccines for Children program.

It must be emphasized that there is a special schedule for infants of Hepatitis B surface-antigen-positive mothers. That is to give the high-risk formulation of the vaccine at birth (along with Hepatitis B Immune Globulin), with subsequent high-risk vaccine doses at ages one and six months.

When implementing the sequential IPV/OPV schedule it is important to use the new Polio Vaccine Information Statement dated 2/6/97. For DTaP or DTP, the DTP/DTaP Statement dated 9/13/96 (interim) is suitable for the time being.

Any DTaP vaccine may be used for the 4th and 5th doses. **For the first 3 doses, however, under the Vaccines for Children Program only the DTaP manufactured by Connaught (Tripedia) may be used at present.** Wyeth-Lederle DTaP (ACEL-IMUNE) manufactured prior to this year has a product code 1950 and is not licensed for the first three doses. The new product code 1800 is so licensed, is available commercially, and is expected to be available through federal contract soon.

Questions concerning these matters should be addressed to the Immunization Program to either Steve Weems or Rhenda Mills, RN, at 502-564-4478.

In This Issue . . . .

Human Rabies in Kentucky - 1996

In October, 1996, a south central Kentucky woman died from rabies. This is the first case of human rabies in the state since 1979.

Since 1954 Kentucky has reported 5 cases of human rabies.

1961 - 2 cases
1973 - 1 case
1979 - 1 case

Remember. . .
with proper vaccination rabies can be prevented.

In late September, a 42-year-old female visited a local community hospital emergency department with complaints of dizziness, shoulder pain, and an inability to swallow. The patient was treated for pharyngitis and discharged, but returned later that day with the same complaints and was admitted. Findings on admission included an elevated oral temperature (100.6°F), an unremarkable complete blood count, cerebrospinal fluid (CSF) sample, and computerized axial tomography (CT.) Urinalysis revealed ketonuria and bacteriuria. During the next few hours the patient continued to have difficulty swallowing, gagged and vomited frequently, and had pain in her right arm. Later, she became anxious, agitated, and hysterical. She was treated symptomatically.

The next day she was transferred to a regional hospital with dysphagia and involuntary motor activity of the upper extremities, neck, face, and eyes. She was unable to communicate due to severe neck spasms. Routine laboratory analyses including CSF was unremarkable upon admission. The patient spiked a high fever (105.7°F) that evening. A presumptive diagnosis of viral encephalitis was made and acyclovir therapy was initiated. Her condition continued to deteriorate and on the second day of hospitalization she became hypoxic and was intubated because of progressive bulbar dysfunction. The next morning she was transferred to a university hospital in a neighboring state.

The patient was admitted to the neurology intensive care unit of the university hospital and required mechanical ventilation and cardiopulmonary stabilization for shock. Oral temperature was 102.2°F, systolic blood pressure was 80mm Hg, breath sounds were coarse, and extremities were cyanotic with pitting edema. Sclerae were injected with bilateral proptosis present, pupils were reactive, ocular-cephalic reflex was present, and all spinal reflexes were intact. An electroencephalogram revealed status epilepticus which was uncontrolled by dilantin or benzodiazepines; a coma was induced with pentobarbital. She remained febrile, required vasopressors, and on day 4 of this hospitalization a CT revealed significant generalized brain edema. On day 10 of this hospitalization there was no brainstem activity and no reflexes could be elicited. Mechanical ventilation and vasopressors were withdrawn on day 15 of this hospitalization and the patient died.

Serum drawn from the patient the day after admission at the university hospital was negative for rabies antibodies. A serum sample drawn 8 days later was positive for rabies antibodies at a contract laboratory. The Centers for Disease Control and Prevention found rabies antibodies in postmortem serum and vitreous humor fluid. Vitreous humor was positive for rabies virus nucleic acid by reverse transcriptase polymerase chain reaction analysis. Nucleotide sequence analysis of the viral nucleic acid implicated a variant associated with the silver-haired bat (*Lasionycteris noctivagans*).

The patient and her husband could not recall a history of an animal bite or other wild animal exposure. The family lived in a rural area and reported hearing bird-like noises in the chimney of their house. Investigation of the residence by local health department environmentalists revealed no evidence of bats in the house or chimney.

There were 5 family members and 82 health care workers at 3 hospitals who received postexposure prophylaxis (PEP) because of possible percutaneous or mucous membrane exposure to the patient's saliva.

Comments

There have been 32 cases of human rabies diagnosed within the U.S. since 1980. Twelve of these cases were exposed to rabies variants not found in this country and were due to exposure outside the U.S. Of the 20 human rabies cases acquired domestically, 17 were due to insectivorous bat variants and 12 of these were associated with the silver-haired bat variant. There was a history of contact with a bat in 9 of the 17 bat associated cases with only one recognized bite wound evident. There is ongoing research to determine why bat associated rabies

Human Rabies (continued from page 2)

is pathogenic in cases of limited or seemingly insignificant physical contact. Recently, the CDC has issued recommendations for PEP in which there is reasonable probability that contact with a bat could have occurred and rabies can not be ruled out through prompt testing of the bat. Situations which now warrant PEP administration include finding a bat in a room with a sleeping person, an unattended child, someone mentally or physically challenged, or an intoxicated individual.

The diagnosis of human rabies in this country usually is made only in the later stages of the disease or postmortem. Human rabies, while rare, should be included in the differential diagnoses of any encephalitis in which the etiologic agent is not identified through usual laboratory analyses and diagnostic tests. After interviewing health care providers in contact with this patient, it should be noted that upon retrospective reflection there were several characteristic mental and physical changes present in the patient. Reported "textbook" traits included "hydrophobia", "an impending feeling of doom" (the patient in this report claimed she was dying at the beginning of her hospitalization), and "anxiety, agitation, and combativeness."

Early suspicion of rabies may have reduced the number of health workers receiving PEP. The use of minimal precautions (rubber gloves, face shield) around the patient would have prevented any possibility of exposure. The large number of people taking PEP after even casual contact with a human rabies case is to be expected. However, it should be noted that there has never been a documented case of human to human rabies transmission in the developed world.

Animal Rabies in Kentucky - 1996

The Division of Laboratory Services and the Breathitt Veterinary Center received 1606 animal specimens for testing in 1996. There were 98 samples unsuitable for testing because of decomposition or extreme traumatic damage to the brain. There were 43 (2.9%) specimens that tested rabies positive; 11 (25.6% of positives) cases were in domestic animals and the remaining 32 cases were wildlife. As usual, skunks were the majority (62.8%) of rabid animals found by our laboratories and also the highest percent positive for any given species. (Table 1.)

Table 1. Animals Submitted for Testing and Number of Positives by Species

Species	Dogs	Cats	Other Domestics	Bats	Skunks	Other Wildlife
Tested	544	409	127	54	58	316
Positive	4	1	*6	5	27	0
% Positive	0.7	0.2	4.7	9.3	46.6	0

*5 Horses, 1 Cow

There was a concentration of rabies activity in skunks in the south central part of the state Figure 1 (shown on page 6). Rabid bats were reported from across the state. The statewide distribution pattern shown in Figure 1 may not be completely representative of rabies activity in the state; it may only reflect the distribution of samples submitted for testing.

Raccoon rabies continues to be a problem for all the eastern coastal states, however, Kentucky's laboratories have not found a rabid raccoon since 1991, and this case was most likely a spillover of skunk rabies. Although Kentucky tested 145 raccoons for rabies last year, there were no submissions of raccoons from any eastern counties adjacent to West Virginia or Virginia which are undergoing the current raccoon rabies epizootic. This may reflect a low raccoon population in the mountain areas due to a lack of desirable habitat, hunting and trapping practices, existence of other fatal epizootics (e.g. distemper) or a combination of these and other factors.

Animal Rabies in Kentucky - 1996 (continued from page 3)

Animal rabies in this state has increased and declined in 6 - 8 year cycles over the last 35 years. It appears that the current cycle "bottomed out" in 1993 (20 cases) and the number of cases is climbing again. Another unusual phenomenon was an increase in the number of equine rabies cases; horses accounted for 11.6% (5/43) of positive rabies tests in 1996, but only 2.1% (15/727) of positive cases for the previous ten year period.

Even though the absolute number of domestic animals with rabies is low, human exposure to rabies occurred in 100% (11/11) of these cases, and frequently there were multiple human exposures. Rabid skunks exposed humans in only 18.5% (5/27) of the cases, but in 37% (10/27) of the skunk cases a domestic animal was exposed which could become a potential exposure source for humans if the domestic animal were to develop rabies. Rabid bats were involved in a human exposure in 80% (4/5) of the incidents and exposed a domestic animal in the other incident.

The necessity of vaccinating domestic animals, particularly dogs and cats, is extremely important to prevent the spread of wildlife rabies into the human population. There is an approved vaccine available for ferrets and should be used for all pet ferrets. (This does not mean that ferrets can be routinely quarantined for observation, and it still may be necessary to sacrifice them for testing.) Other rabies vaccines are available for the protection of horses, cattle, and sheep, and their use may be desirable if wildlife rabies is a problem in the area. There are no approved rabies vaccines available for wildlife including wolf hybrids; keeping of any wildlife or wildlife hybrid as a pet is strongly discouraged. An oral vaccine used to control wildlife rabies epizootics is conditionally approved, but may only be used by state and federal agencies for the control of selected epizootics.

Most health care workers do not use rabies biologicals on a daily basis and may be unfamiliar with their use. The Division of Epidemiology received over 600 requests for consultation on rabies, animal bites, and related subjects last year, and is very familiar with the problems encountered in the field. If you need assistance in determining exposure status or in using the available rabies products, please call Michael Auslander, DVM, MSPH, State Public Health Veterinarian at 502-564-3418. Vaccine is available for local health department use from the vaccine depot, and private health care providers can order vaccine directly by calling Connaught Laboratories at (800) VACCINE.

1996 Physician Award

On February 14, 1997 Dr. Reginald Finger, Director, Division of Epidemiology presented the fourth annual "Best Notifiable Disease Reporter Award" to Dr. Frank Walker of Louisville, Kentucky. This annual award is presented to a physician for outstanding contribution during the previous year to the prevention and control of communicable diseases. Dr. Walker was instrumental in the management of the Shigella outbreak in Jefferson County.

Congratulations Dr. Walker!

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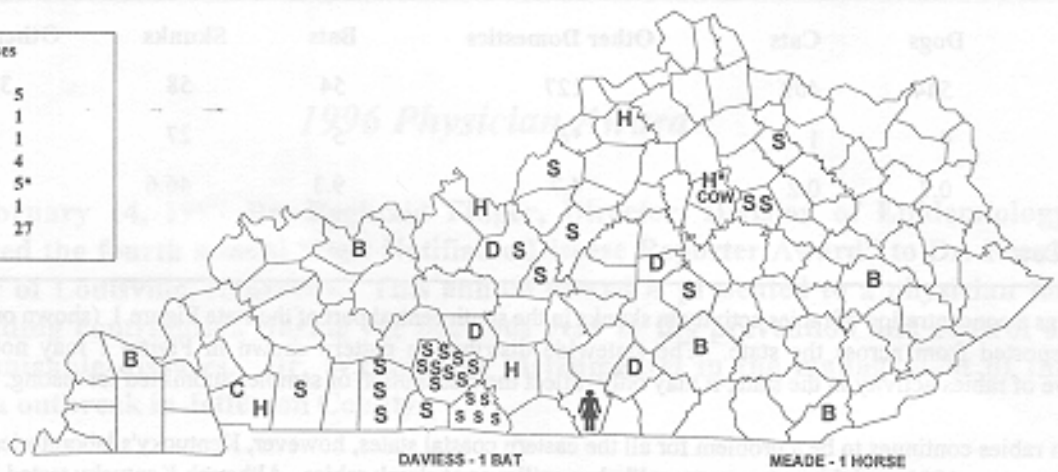
Figure 1. Rabies Cases in Kentucky - 1996

44 Cases - January 1, 1996 through December 31, 1996. This total includes the first case of Human Rabies in Kentucky since 1979. The Centers for Disease Control and Prevention has determined this case to be the Silver-Haired Bat Variant.

Rabies Cases	
Bats	5
Cat	1
Cow	1
Dogs	4
Horses	5*
Human	1
Skunks	27



ALLEN - 6 SKUNKS
BARREN - 1 HORSE
BELL - 1 BAT
BOYLE - 1 DOG
BREATHITT - 1 BAT
CHRISTIAN - 1 SKUNK
CLARK - 2 SKUNKS
CUMBERLAND - 1 HUMAN
DAVIESS - 1 BAT
EDMONSON - 1 DOG
FAYETTE - 1 COW, 1 HORSE*
HARDIN - 1 DOG, 1 SKUNK
HENRY - 1 HORSE
JEFFERSON - 1 SKUNK
LARUE - 1 SKUNK
LINCOLN - 1 SKUNK
LOGAN - 3 SKUNKS
MEADE - 1 HORSE
MCCRACKEN - 1 BAT
NELSON - 1 SKUNK
NICHOLAS - 1 SKUNK
PULASKI - 1 BAT
RUSSELL - 1 DOG
SIMPSON - 1 SKUNK
TRIGG - 1 CAT, 1 HORSE
WARREN - 9 SKUNKS

*1 HORSE IMPORTED FROM TENNESSEE

Recommended Childhood Immunization Schedule
United States, January - December 1997

Vaccines [1] are listed under the routinely recommended ages. Bars indicate range of acceptable ages for vaccination. Shaded bars indicate catch-up vaccination: at 11-12 years of age, Hepatitis B vaccine should be administered to children not previously vaccinated, and Varicella Virus vaccine should be administered to unvaccinated children who lack a reliable history of chickenpox.

Age ▶ / Vaccine ▼	Birth	1 mo	2 mos	4 mos	6 mos	12 mos	15 mos	18 mos	4-6 yrs	11-12 yrs	14-16 yrs
Hepatitis B[2,3]	Hep B-1										
		Hep B-2			Hep B-3					Hep B[3]	
Diphtheria, Tetanus, Pertussis[4]			DTaP or DTP	DTaP or DTP	DTaP or DTP		DTaP or DTP[4]		DTaP or DTP	Td	
H. influenzae type b[6]			Hib	Hib	Hib[6]	Hib[6]					
Polio[6]			Polio[6]	Polio		Polio[6]			Polio		
Measles, Mumps, Rubella[7]						MMR			MMR[7]	or MMR[7]	
Varicella[8]						Var				Var[8]	

Approved by the Advisory Committee on Immunization Practices (ACIP), the American Academy of Pediatrics (AAP), and the American Academy of Family Physicians (AAFP).

[1] This schedule indicates the recommended age for routine administration of currently licensed childhood vaccines. Some combination vaccines are available and may be used whenever administration of all components of the vaccine is indicated. Providers should consult the manufacturers' package inserts for detailed recommendations.

[2] ***Infants born to HBsAg-negative mothers*** should receive 2.5 µg of Merck vaccine (Recombivax HB®) or 10 µg of SmithKline Beecham (SB) vaccine (Engerix-B®). The 2nd dose should be administered ≥1 mo after the 1st dose.
Infants born to HBsAg-positive mothers should receive 0.5 mL hepatitis B immune globulin (HBIG) within 12 hrs of birth, and either 5 µg of Merck vaccine (Recombivax HB®) or 10 µg of SB vaccine (Engerix-B®) at a separate site. The 2nd dose is recommended at 1-2 mos of age and the 3rd dose at 6 mos of age.
Infants born to mothers whose HBsAg status is unknown should receive either 5 µg of Merck vaccine (Recombivax HB®) or 10 µg of SB vaccine (Engerix-B®) within 12 hrs of birth. The 2nd dose of vaccine is recommended at 1 mo of age and the 3rd dose at 6 mos of age. Blood should be drawn at the time of delivery to determine the mother's HBsAg status; if it is positive, the infant should receive HBIG as soon as possible (no later than 1 wk of age). The dosage and timing of subsequent vaccine doses should be based upon the mother's HBsAg status.

[3] Children and adolescents who have not been vaccinated against hepatitis B in infancy may begin the series during any childhood visit. Those who have not previously received 3 doses of hepatitis B vaccine should initiate or complete the series during the 11-12 year-old visit. The 2nd dose should be administered at least 1 mo after the 1st dose, and the 3rd dose should be administered at least 4 mos after the 1st dose, and at least 2 mos after the 2nd dose.

[4] DTaP (diphtheria and tetanus toxoids and acellular pertussis vaccine) is the preferred vaccine for all doses in the vaccination series, including completion of the series in children who have received ≥1 dose of whole-cell DTP vaccine. Whole-cell DTP is an acceptable alternative to DTaP. The 4th dose of DTaP may be administered as early as 12 mos of age, provided 6 mos have elapsed since the 3rd dose, and if the child is considered unlikely to return at 15-18 mos of age. Td (tetanus and diphtheria toxoids, adsorbed, for adult use) is recommended at 11-12 yrs of age if at least 5 yrs have elapsed since the last dose of DTP, DTaP, or DT. Subsequent *routine* Td boosters are recommended every 10 yrs.

[5] Three *H. influenzae* type b (Hib) conjugate vaccines are licensed for infant use. If PRP-OMP (PedvaxHIB® [Merck]) is administered at 2 and 4 mos of age, a dose at 6 mos is not required. After completing the primary series, any Hib conjugate vaccine may be used as a booster.

[6] Two poliovirus vaccines are currently licensed in the US: inactivated poliovirus vaccine (IPV) and oral poliovirus vaccine (OPV). The following schedules are all acceptable by the ACIP, the AAP, and the AAFP, and parents and providers may choose among them:

1. IPV at 2 and 4 mos; OPV at 12-18 mos and 4-6 yrs
2. IPV at 2, 4, 12-18 mos, and 4-6 yrs
3. OPV at 2, 4, 6-18 mos, and 4-6 yrs

The ACIP routinely recommends schedule 1. IPV is the only poliovirus vaccine recommended for immunocompromised persons and their household contacts.

[7] The 2nd dose of MMR is routinely recommended at 4-6 yrs of age or at 11-12 yrs of age, but may be administered during any visit, provided at least 1 mo has elapsed since receipt of the 1st dose, and that both doses are administered at or after 12 mos of age.

[8] Susceptible children may receive Varicella vaccine (Var) during any visit after the 1st birthday, and unvaccinated persons who lack a reliable history of chickenpox should be vaccinated during the 11-12 year-old visit. Susceptible persons ≥13 yrs of age should receive 2 doses, at least 1 mo apart.